Agency NITRD Budgets by Program Component Area

FY 2006 Budget Estimates
and
FY 2007 Budget Requests
(Dollars in Millions)

Agency		High End Computing Infrastructure & Applications (HEC I&A)	High End Computing Research & Development (HEC R&D)	Cyber Security & Information Assurance[1] (CSIA)	Human-Computer Interaction & Information Management (HCI &IM)	Large Scale Networking (LSN)	High Confidence Software & Systems (HCSS)	Social, Economic, & Workforce Implications of IT (SEW)	Software Design & Productivity (SDP)	Total
NSF	2006 Estimate	220.3	62.7	57.6	207.4	82.2	41.3	91.1	47.9	810.3
NSF	**2007 Request**	**272.4**	**64.1**	**67.6**	**220.9**	**84.0**	**51.3**	**92.9**	**50.7**	**903.7**
OSD and DoD Service research orgs.[2,3]		214.6	9.8	0.6[4]	138.5	141.8	31.2	0.2	6.9	543.7
		186.0	**8.7**	**0.7[4]**	**135.6**	**130.7**	**29.1**	**0.3**	**6.8**	**497.8**
NIH[5]		198.5			188.7	74.9	8.4	12.3	17.9	500.6
		194.7			**183.2**	**74.6**	**8.3**	**12.2**	**17.7**	**490.7**
DARPA[3]			94.1	78.7	174.2	21.3				368.3
			117.7	**81.6**	**233.2**	**33.2**				**465.7**
DOE/SC[6]		104.4	109.1			38.9		3.5		255.8
		135.3	**160.4**			**45.0**		**4.0**		**344.7**
NSA[3]			89.2	14.1		1.0	36.2			140.5
			62.4	**13.3**		**2.3**	**39.9**			**117.9**
NASA		60.3		1.3	2.0	5.7	7.0		1.8	78.1
		63.9		**1.3**	**2.0**	**6.0**	**7.0**		**1.8**	**82.0**
AHRQ[5]					40.1	21.6				61.7
					37.3	**20.0**				**57.3**
NIST[7]		2.3	1.2	9.1	7.8	4.3	9.6		4.6	38.9
		2.3	**1.2**	**11.1**	**9.8**	**4.3**	**9.6**		**4.6**	**42.9**
DOE/NNSA[6]		10.0	15.9			1.6		4.6	3.3	35.4
		9.5	**23.4**			**1.6**		**4.6**	**2.8**	**41.9**
NOAA[7]		11.4	1.9		0.2	0.7			1.6	15.8
		16.4	**1.9**		**0.5**	**2.9**			**1.6**	**23.3**
EPA		3.3			3.0					6.3
		3.3			**3.0**					**6.3**
TOTAL (2006 Estimate)		825.0	383.9	161.3	761.9	393.9	133.6	111.6	84.0	2,855
TOTAL (2007 Request)		**883.8**	**439.9**	**175.5**	**825.4**	**404.5**	**145.2**	**114.0**	**85.9**	**3,074**

[1] The CSIA PCA budget should not be viewed as the total Federal investment in cyber security R&D. This figure includes only reporting for NITRD member agencies; it does not include investments at other agencies that support cyber security R&D, including DHS, DOJ, TSWG, non-NITRD-member organizations within DOE, and others. Furthermore, funding categorized under the HCSS PCA includes investments in various areas associated with secure and trustworthy systems. These investments are classified under HCSS – a PCA that has historically been part of the NITRD Program – but would be considered to fall within the generic scope of cyber security R&D if HCSS did not exist as a separate PCA.

[2] The OSD budget includes for the first time this year funding from the DoD Service research organizations (Air Force, Army, Navy) as well as DoD's High Performance Computing Modernization Program Office (HPCMPO). Total NITRD budgets for the DoD Service research organizations are as follows: Air Force – $133 million (2006 estimate) and $139 million (2007 request); Army – $141 million (2006 estimate) and $120 million (2007 request), and Navy – $35 million (2006 estimate) and $33 million (2007 request). NITRD-related R&D budgets for HPCMPO are $203 million (2006 estimate) and $174 million (2007 request).

[3] Combined OSD, DARPA, and NSA agency totals supersede the Department of Defense total appearing in the President's 2007 Budget. Discrepancies result from rounding and late shifts in budget accounting.

[4] The share of DoD Service research organizations' NITRD funding reported in CSIA may increase in future years as some R&D currently reported in other PCAs may be reclassified as CSIA R&D, and other PCA reporting would decrease accordingly.

[5] Combined NIH and AHRQ agency totals supersede the Department of Health and Human Services total appearing in the President's 2007 Budget. Discrepancies result from rounding and late shifts in budget accounting.

[6] Combined DOE/SC and DOE/NNSA agency totals supersede the Department of Energy total appearing in the President's 2007 Budget. Discrepancies result from late shifts in budget accounting.

[7] Combined NIST and NOAA agency totals supersede the Department of Commerce total appearing in the President's 2007 Budget. Discrepancies result from rounding and late shifts in budget accounting.

NITRD Program Budget Analysis

2006 and 2007 Budget Overview

In general, differences between the President's Budget request for a given year and estimated spending for that year reflect revisions to program budgets due to evolving priorities, as well as Congressional actions and appropriations. While budget information reported on the preceding page includes such variations, several additional factors specific to the NITRD Program have led to substantial differences between the 2006 budget request and 2006 estimated spending. These include the addition of the CSIA PCA to the NITRD Program, new reporting of activities in response to evolving definitions of NITRD PCAs, and the addition of reporting from organizations that had participated in coordinated NITRD activities but had not previously been included in the NITRD budget crosscut. For example, OSD's High Performance Computing Modernization Program Office (HPCMPO) and DoD Service research organizations (Air Force, Army, and Navy) have been added to the crosscut. In addition, efforts at several agencies to improve the classification and characterization of agency activities have resulted in noteworthy changes in budget reporting ranging from additional reporting or removal of out-of-scope investments to shifts of funds between PCAs.

2006 Summary

The estimated 2006 NITRD budget is $2.86 billion, which is a $0.70 billion increase over the $2.16 billion 2006 request. Of this increase, approximately $0.08 billion represents actual increases in spending above 2006 requested funds. The remaining $0.62 billion increase is the combination of an additional $0.18 billion in newly reported funding due to the addition of the CSIA PCA and evolving PCA definitions, an increase of $0.52 billion due to the addition of OSD's HPCMPO and DoD Service research organizations, and a reduction of $0.08 billion due to improved classification and characterization of agency activities.

Changes to NITRD agency budgets are explained in detail in the Analysis by Agency section below. Due to these changes, the 2006 budget request published in last year's NITRD Budget Supplement no longer provides an effective baseline for comparison to the 2007 request and future budgets.

2007 Summary

The 2006 estimates and the 2007 budget requests in the table on the preceding page include reporting from the same agencies and make use of the same scope, definitions, and classification of investments. Thus, the 2006 estimates serve as an appropriate baseline for comparison with the 2007 requests and future budgets.

The President's 2007 Budget request for the NITRD Program is $3.07 billion, an increase of $0.21 billion over the $2.86 billion 2006 estimate. The 2007 budget requests funding increases above 2006 estimated spending for all eight NITRD PCAs. The high-end computing PCAs account for slightly more than half of the increase, and the HCI&IM PCA accounts for approximately another quarter of the increase.

The Administration's recently announced American Competitiveness Initiative has increased the NITRD budgets of agencies that are part of the Initiative. The Initiative calls for a doubling over 10 years of the investment in three Federal agencies that support basic research programs in the physical sciences and engineering. These agencies – NSF, DOE/SC, and NIST – are NITRD Program member agencies. All three received 2007 NITRD budget increases that exceed the percentage increase in the overall Program budget, as follows: NSF, 12 percent; DOE/SC, 35 percent; and NIST, 10 percent. The aggregated NITRD budget increase for these three agencies from 2006 estimates to 2007 request is $186 million (17 percent above 2006 estimates), which accounts for over 85 percent of the overall NITRD Program budget increase for 2007.

Budget numbers are rounded to the nearest million in the discussions that follow, and may result in minor discrepancies in sums due to rounding.

NITRD Program Budget Analysis by Agency

The following NITRD Program budget analysis by agency summarizes 2006 estimates and 2007 requests for each NITRD agency and provides explanations of significant[8] changes in budget – either differences between 2006 requested funding and 2006 estimated spending or changes between 2006 estimated spending and 2007 requests.

NSF
Comparison of 2006 request ($803 million) and 2006 estimate ($810 million): The increase in HEC I&A is due largely to pooling 2005 and 2006 funding to increase the size of a planned HEC system acquisition. Some HEC R&D funding has been moved to HEC I&A to better reflect the nature of work being done under certain HEC grants. HEC funding for work related to the collection and management of large datasets resulting from HEC applications has been moved to HCI&IM. The increase in HCI&IM is also due to increased R&D for better management of scientific data, as part of NSF's cyberinfrastructure investments. HCSS shows a decrease because some funding previously reported in HCSS is now reported under CSIA; however the sum of the CSIA and HCSS budgets has increased by $23 million due to greater investment in related areas. This increase is offset by decreases in the LSN and SDP budgets.

Comparison of 2006 estimate ($810 million) and 2007 request ($904 million): HEC I&A increases $52 million to support the acquisition of a petascale leadership-class HEC system. HCI&IM increases $14 million for cyberinfrastructure-related data and information management R&D. CSIA and HCSS each increase $10 million, reflecting continued emphasis on Cyber Trust and related high-confidence and information assurance research activities.

OSD and DoD Service research organizations
Comparison of 2006 request ($22 million) and 2006 estimate ($544 million): The NITRD budget includes for the first time this year funding from OSD (HPCMPO) and DoD Service research organizations, which is in addition to previously reported funding from OSD's Office of the Director, Defense Research and Engineering (ODDR&E). The 2006 estimate for HPCMPO is $210 million. The 2006 estimates for the DoD Service research organizations are $133 million for the Air Force, $141 million for the Army, and $35 million for the Navy.

The increase in the two HEC PCAs is primarily due to the addition of OSD's HPCMPO to NITRD Program reporting, with a small additional contribution due to the addition of DoD Service research organizations. The reporting of funding in HCI&IM is due to the addition of reporting by DoD Service research organizations, as is nearly all of the funding reported in LSN. To more accurately reflect the nature of the work being performed by OSD's Software Engineering Institute, the $18 million investment associated with this work was shifted from the SDP budget to the HCSS budget. The remaining increases in these two PCA budgets are due to the addition of the DoD Service research organizations.

Comparison of 2006 estimate ($544 million) and 2007 request ($498 million): The reduction in the HEC I&A budget is the result of reductions to the HPCMPO budget, as part of broader DoD funding reallocations. The reduction in the LSN budget is the result of reductions to the Army budget, as part of broader DoD funding reallocations.

NIH
Comparison of 2006 request and 2006 estimate (both $501 million): Nearly all NIH investments previously reported as HEC R&D have been reclassified as HEC I&A. This and other movements of funds from one PCA to another do not represent changes in programmatic investments, but have been made to better align the reporting of NIH investments with the definitions of the NITRD PCAs.

Comparison of 2006 estimate ($501 million) and 2007 request ($491 million): The overall agency budget reflects a two percent reduction in the NIH NITRD budget.

DARPA
Comparison of 2006 request ($176 million) and 2006 estimate ($368 million): The $13 million increase in the HEC R&D budget reflects the inclusion of the Architectures for Cognitive Information Processing program. The

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[8] For the purpose of this analysis, budget differences that exceed $10 million for an agency within a single PCA are considered "significant" enough to warrant explicit explanation. For agencies with smaller overall NITRD budgets, explanations are provided for differences that account for significant percentages of an agency's PCA budget, even in instances where those changes are smaller than $10 million.

addition of the CSIA PCA to the NITRD Program resulted in $79 million of new reporting. The evolving definition of HCI&IM led to $100 million of new funding reported for that PCA, for DARPA's Learning, Reasoning and Integrated Cognitive Systems programs.

Comparison of 2006 estimate ($368 million) and 2007 request ($466 million): The $24 million increase in HEC R&D is for Phase III of the High Productivity Computing Systems program. The $59 million increase in HCI&IM is due to increases in DARPA's language translation programs. The $12 million increase in LSN is the result of scaling up cognitive networking activities for technical demonstrations and testbeds with the military services.

DOE/SC
Comparison of 2006 request ($227 million) and 2006 estimate ($256 million): The $27 million increase in HEC R&D is to support development of a HEC Leadership Computing Facility at Oak Ridge National Laboratory.

Comparison of 2006 estimate ($256 million) and 2007 request ($345 million): The $31 million increase in HEC I&A is to enhance SciDAC partnerships to deliver applications for petascale computing systems in areas critical to DOE missions and complementary investments to expand high-performance computing capacity at NERSC. The $51 million increase in HEC R&D is for enhancements to the Leadership Computing Facility including investments at ORNL and investments at ANL in low power density leadership-class computing, which were a part of the original competitively selected Leadership Computing Facility proposal.

NSA[9]
Comparison of 2006 request ($101 million) and 2006 estimate ($141 million): HEC R&D increased $52 million to accelerate Black Widow and Eldorado system investments; a $12 million reduction in HCSS investments helped offset this increase. The decrease in the HCSS budget is also due to a shift in reporting of $14 million of investments to the new CSIA PCA.

Comparison of 2006 estimate ($141 million) and 2007 request ($118 million): With accelerated investments in 2006, Black Widow R&D will be largely completed, reducing funding required in 2007.

NASA
Comparison of 2006 request ($74 million) and 2006 estimate ($78 million): HEC I&A increased $7 million due to Columbia high-end computing system costs being higher than initially estimated. A shift to agency-wide management of HEC investments adds an additional $19 million of investments at Goddard Space Flight Center to HEC I&A. Reductions in HCI&IM, LSN, and HCSS are due to NASA's continuing transformation to focus on R&D aimed at implementing its Vision for Space Exploration.

Comparison of 2006 estimate ($78 million) and 2007 request ($82 million): NASA's budget remains relatively stable from 2006 to 2007.

AHRQ
Comparison of 2006 request ($68 million) and 2006 estimate ($62 million): AHRQ's LSN budget decreases due to reductions in research on privacy and security law, and in health information exchanges at the state level in support of large-scale exchanges of health information at regional and national levels.

Comparison of 2006 estimate ($62 million) and 2007 request ($57 million): Beginning in 2007, the HHS will take the lead on data standards interagency agreements, resulting in some of the $10 million that AHRQ had budgeted for this work being reallocated to spending outside of the NITRD Program.

NIST
Comparison of 2006 request ($42 million) and 2006 estimate ($39 million): Reductions in HEC I&A and HCI&IM spending account for the decrease in NIST's budget. The addition of CSIA as a new PCA results in funding that had previously been reported under HCSS now being nearly equally divided between the CSIA and HCSS PCAs.

Comparison of 2006 estimate ($39 million) and 2007 request ($43 million): NIST's budget receives a $4 million increase from 2006 to 2007, divided equally between the CSIA and HCI&IM PCAs.

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[9] NSA's budget reporting includes unclassified funding from DTO (formerly ARDA).

DOE/NNSA

Comparison of 2006 request ($114 million) and 2006 estimate ($35 million): A portion of the reduction in DOE/NNSA's budget is due to decreases in the ASC Program budget. The bulk of the reduction does not correspond to changes in programmatic activities, but is due to new classification and characterizations of DOE/NNSA investments resulting from new business processes in use at the agency. The percentage of major technical efforts categorized as R&D has been reduced in several instances, while investments in network infrastructure, legacy codes, infrastructure operations and maintenance, data management activities, storage procurements, and software tools development and licenses have been characterized as outside the scope of R&D activities. For comparison, had investments been categorized per these new business processes last year, the previously reported 2006 request would have been $39 million.

Comparison of 2006 estimate ($35 million) and 2007 request ($42 million): The main component of DOE/NNSA's budget increase is an increase of $8 million in HEC R&D, to support participation as a mission partner in Phase III of DARPA's HPCS program, and to pursue a next-generation successor to the BlueGene/L high-end computing system.

NOAA

Comparison of 2006 request ($20 million) and 2006 estimate ($16 million): The decrease in NOAA's budget, mostly in HEC I&A, is due to Congressional action reducing NOAA's operations, research, and facilities budget.

Comparison of 2006 estimate ($16 million) and 2007 request ($23 million): The 2007 request restores funds cut in 2006 and includes additional increases, mainly to HEC I&A.

EPA

Comparison of 2006 request, 2006 estimate and 2007 request (all $6 million): The NITRD Program budget for EPA remains level at $6 million.

NITRD Program Budget Summary by PCA

A broad analysis of the NITRD Program budget by PCA, which summarizes the most substantial changes to PCA budgets in 2007 using 2006 estimated spending as a baseline, appears below. This section summarizes the more detailed information about significant changes within agency budgets provided above.

Because of the continuing priority placed on high-end computing by the Administration, the 2007 budget request for HEC I&A is $884 million, an increase of $59 million above 2006 estimated spending. The bulk of the new funding is requested by NSF and DOE/SC for procurements of and/or enhancements to leadership-class computing systems. Budget increases more than offset the reduction in OSD's HEC I&A budget, due to higher-level funding reallocations within DoD, primarily within HPCMPO.

Also because of the budget emphasis on high-end computing, the 2007 budget request for HEC R&D is $440 million, an increase of $56 million above 2006 estimated spending. Most of the change is accounted for by budget increases for DOE/SC to enhance its SciDAC partnerships and for DARPA for Phase III of the HPCS program, a planned decrease in NSA's request due to the 2006 acceleration of Black Widow R&D, and an increase in DOE/NNSA's request.

As a new NITRD PCA, CSIA reports R&D in the NITRD Program Budget Supplement for the first time this year. The 2007 budget request for CSIA is $176 million,[10] an increase of $14 million above 2006 estimated spending. This increase is mainly the result of a larger budget request at NSF due to an elevated emphasis on cyber security via the Cyber Trust program and related activities.

The 2007 budget request for HCI&IM is $825 million, an increase of $63 million above 2006 estimated spending. Budget request increases at NSF for R&D in scientific data management and at DARPA for its Learning, Reasoning and Integrated Cognitive Systems programs are the most substantial changes for this PCA.

The 2007 budget request for LSN is $405 million, an increase of $11 million above 2006 estimated spending. Increases in budget requests at DARPA for scaling up cognitive networking activities, and at DOE/SC for enhancements to ESnet to support management of petascale data from scientific facilities and high performance

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[10] Please see footnote 1 on page 20.

computing facilities, account for most of the change in this PCA. Budget increases more than offset the reduction in DoD Service research organizations' LSN budget, due to higher-level funding reallocations within DoD, primarily within the Army.

The 2007 budget request for HCSS is $145 million, an increase of $12 million above 2006 estimated spending. An increase in NSF's budget request for HCSS accounts for most of this difference.

The 2007 budget request for SEW is $114 million, an increase of $2 million above 2006 estimated spending. Funding for this PCA remains relatively stable.

The 2007 budget request for SDP is $86 million, an increase of $2 million above 2006 estimated spending. Funding for this PCA remains relatively stable.